

## Actor-Network Theory (ANT) as an alternative to overcoming the dualities of the informational behavior studies

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### ABSTRACT

**Introduction:** In the field of information user studies, the shift from the system-centered to the user-centered information paradigm brought to the forefront individual and cognitive aspects of informational activities. This point of view was criticized by emerging social approaches for neglecting social and contextual aspects. This movement generates tensions between researchers who adopt positions focused on the centrality on the user, or on the context or some intermediate position between the two poles, which inevitably interferes with the results of their researches.

**Objective:** The article aims to analyze the Actor-Network Theory (ANT) as an alternative to the reductionist polarities that are present in the field of user studies. **Methodology:** The analysis was carried out through a bibliographic review on user studies, informational behavior, and ANT. **Results:** The study reveals a differentiated approach to tracking informational activities, since it considers that information users, whether individual or collective, continuously exchange properties on the same plane, without the aforementioned polarization or search for intermediate positions. **Conclusions:** The article presents the ART as a coherent and opportune alternative for the apprehension of contemporary informational phenomena.

### KEYWORDS

Actor-network theory (ANT). Informational behavior. Information user studies.

## Teoria Ator-Rede (TAR) como alternativa à superação das dualidades presentes nos estudos de comportamento informacional

### RESUMO

**Introdução:** No campo dos estudos de usuários da informação, a mudança do paradigma centrado no sistema para o centrado no usuário da informação trouxe aspectos individuais e cognitivos das atividades informacionais para o primeiro plano. Esse ponto de vista foi criticado por abordagens sociais emergentes por negligenciar aspectos sociais e de contexto. Esse movimento gera tensões entre investigadores que adotam posicionamentos focados na centralidade no usuário, ou no contexto ou em alguma posição intermediária entre os dois polos, o que inevitavelmente interfere nos resultados de suas pesquisas. **Objetivo:** O artigo objetiva analisar a Teoria Ator-Rede (TAR) como uma alternativa às polaridades reducionistas presentes no campo de estudos de usuários. **Metodologia:** A análise foi realizada por meio de revisão bibliográfica sobre estudos de usuários, comportamento informacional e TAR. **Resultados:** O estudo revela uma abordagem diferenciada no rastreamento de atividades informacionais ao considerar que usuários da informação, sejam eles individuais ou coletivos, continuamente trocam propriedades em um mesmo plano, sem a referida polarização ou a busca por posições intermediárias. **Conclusões:** O artigo apresenta

a TAR não apenas como uma alternativa coerente, mas oportuna para a apreensão de fenômenos informacionais contemporâneos.

**PALAVRAS-CHAVE**

Teoria Ator-Rede (TAR). Comportamento informacional. Estudos de usuários.



JITA: CB. User studies.

## 1 INTRODUCTION

The efficient use of information in different contexts and the identification of needs and informational behavior of both individuals and groups, occupy a prominent place in research in Information Science (IC) (MARTINEZ-SILVEIRA; ODDONE, 2007). Therefore, the opening to the observation of informational phenomena through different prisms, not originated in the IC, potentializes new interpretations for long-settled issues, such as the divergence between different points of view regarding the centrality of research attentions in individuals, or in contexts. This polarization is due to strands of thought that are both less or more in agreement with one approach or with the other, which allows an interpretation of polarization among researches in the field of user studies.

In this sense, this article aims to analyze the Actor-Network Theory (ANT) and especially some of its elements that allow it to be adopted as an alternative for the mapping of informational phenomena, in contrast to reductionist polarities present especially in studies of information users.

To achieve this purpose, the methodology adopted was based on a literature review that confronted some aspects of user studies and informational behavior with some fundamental elements of the analytical framework of ANT. The findings of this study indicate a useful way for investigations of informational phenomena under the symmetrical lenses of ANT. We are facing a pertinent approach for tracking informational activities by considering that information users, be they individual or collective, continuously exchange properties on the same level, without the aforementioned polarization or the search for intermediate positions.

Following the structuring of the article, it was necessary to abstract what the field of user studies has produced, especially under some points of tension between distinct currents of thought. In this direction, the first three sections are dedicated in exposing the distinct opinions that surround discussions anchored in the paradigms of this field. The next two sections present the sociotechnical approach by exposing the fundamentals of ANT, which advocates a symmetrical anthropology in which the elements that make up the parts of heterogeneous networks, are treated under the same terms. The last session recalls and confronts elements exposed so far, proposing an interlocution between ANT and the paradigms of information user studies. Finally, the concluding considerations and possible future developments that emerge from the analysis are presented.

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## 2 INFORMATIONAL BEHAVIORS: FROM THE GENESIS OF USERS FOCUSED ON INFORMATION SYSTEMS TO COGNITIVISM

Since The Royal Society Scientific Information Conference in 1948 in the United Kingdom, the first studies on the subject of information users discussed, among other topics, the collection of quantitative data and scientific communication when mainly questionnaires were used. In this first moment, the focus of these studies was the use of information by scientists and engineers, evidencing an approach focused on technological tools. The classical procedures of librarianship, as a provider of specific information searches to users, are evident in this period. Information was perceived as objective and addressed its use to collection evaluations and information systems. This first phase, called "use studies," is commonly referred to as the traditional approach and remains in place (FIGUEIREDO, 1994; ARAÚJO, 2014; ARAÚJO, 2016; SARACEVIC, 1992; COURTRIGHT, 2007; CHOO, 2006; WILSON, 2000; COSTA; GASQUE, 2010).

Although many authors agree that there has been an evolution of this first paradigm, from a system-centered position to another focused on the user of information, especially after the article by Dervin and Nilan (1986), other authors such as Talja and Hartel (2007) argue that the beginning of user-centered research dates back to the 1950s and 1960s.

User studies, as time went by, started to be called information behavior studies, suggesting a broader range with cognitive aspects (SANTOS; MARTINS, 2016). It was Wilson (2000) who first coined the term informational behavior and proposed conceptual models revisiting them later in order to make them broader in their definition. It is important to note that the term informational behavior, according to Gasque and Costa (2003), is mostly used in the international literature, while in Brazil it is generally approached under the label of "user studies".

In common, the researches that focus on this second moment, present a cognitivist perspective in which it seeks to understand what is the information from the mental structures of users who relate to this information (ARAÚJO, 2009). In this period, some studies stood out for their relevance and influence, such as the sense making theory of Dervin (1998), the constructivist approach of Kuhlthau (1991), the anomalous state of knowledge of Belkin (1980), the value-added perspective of Taylor (1986), the informational behavior of Wilson (1981), among others. Belkin (1990) stated that the main assumption of the cognitive viewpoint is that the individual mind is the most important area for information processing.

Gasque and Costa (2010) clarify that the psychological, cognitive, and sociological aspects are evidenced in this second moment, differentiating themselves from the positivist and behaviorist aspects of the traditional approach. The authors admit there are advances in this conceptual framework that, among other characteristics, recognize the subjectivity resulting from a reality that does not convey constant meaning. In this conceptual framework, the system is understood as just one of the elements of a broad social context in which individuality and the cognitive aspect become the main elements of attention. In this sense, the core of the issue points to individuals and some aspects related to them, such as needs, motivations, habits, and behaviors (MATTA; SILVA, 2010).

González-Teruel (2017) made an important contribution by comprehensively researching the area of user studies from methodological, epistemological, and ontological perspectives. His research exposed the elements of greatest and least vigor, in his understanding, by comparing and systematizing publications in recent years. His work pointed to what he called objectivist and interpretive paradigms, present in the theoretical tradition in information user studies. In the former, positivism and rationalism prevail, while in the latter, alternative, constructivist and naturalistic approaches prevail.

The need to incorporate social, cultural, and historical factors created a space for researchers' theoretical and empirical attention to context. By the late 1990s, context had become one of the main tenets of the field of information behavior. This is why the next few pages are devoted to understanding the context-based centrality approach and its inconsistency with the approach treated in the cognitive model.

### 3 THE EXPANSION OF CONTEXT-FOCUSED STUDIES

Dervin (1997, p. 14) presents his interpretation of context as "every possible attribute of person, culture, situation, behavior, organization, or structure." This approach is distinguished from approaches by Talja, Keso, and Pietiläinen (1999, p. 752), who add variables considered determinants such as "socioeconomic conditions, work roles, tasks, problem situations, communities and organizations with their structures and cultures, etc." Cool, 2001

(p.8) extends his perspective to a discussion structured on meanings and situations composed of "dynamic environments in which interpretive processes unfold,". Beyond these definitions, Dervin (1997) argues that there is no concept of context that is more widely used or better defined.

Therefore, more important than seeking an unambiguous definition of this concept is to understand the importance and complexity of context for information user studies. Moreover, understanding it implies recognizing that it is a particular set of circumstances from which an information need arises. One possible view is that once this need is identified, "a process of mediation begins between the existing information received and the use/application of the information, for a given purpose, in a given context" (TAYLOR, 1986, p.14). In the same work, the author outlines how much value an information generates for the user depending on the context in which information and actor meet. Thus, messages have value only in certain contexts and depend on the interest of each user. The value of information can, in this way, be added to or removed from a message, allowing information to retain a potential interest depending on the circumstances in which it is presented. On the other hand, it is questioned whether the individual would, in fact, have the capacity to specify exactly an informational need in a social context that is assumed to be static and finished (VAKKARI; SAVOLAINEN, 2003; BERTI; ARAÚJO, 2018).

The interest in context has stimulated the expansion of user-centered studies and theoretical and empirical discussions addressing the topic. A milestone in this evolution was the creation of the ISIC (*Information Seeking in Context*<sup>1</sup>) forum in 1996 that addressed contextualized information activities. In a complementary way, several researchers (WILSON, 1981; VAKKARI; SAVOLAINEN, 2003; McKENZIE, 2003; COURTRIGHT, 2007; PRESSER; SOUZA, 2012) have dedicated themselves to the study of the theme in the field of informational behavior. Derived from these, among other authors, are a series of approaches that seek to explain informational behavior from the multiplicity of relationships with the context. Or, as Presser and Souza (2012) expose, the approaches are carried out in various social spaces that result from the openness and dynamics of these contexts. This movement has gained strength in many manifestations or attempts to represent the area. Indeed, it is appropriate to consider that, some of them seek to support the idea of a break from the cognitivist model, proposing a third social paradigm, of interactionist approach, which suggests an epistemological independence in the field of informational behavior and not an evolution of it.

With a few exceptions, context as a concept appears in the research literature as largely amorphous and illusory. Much of the research in the field continues to equate context with a descriptive physical setting, where one or more contextual variables are identified that are seen as causally or tangentially linked to actors' information practices (COURTRIGHT, 2007). On the other hand, for the author, other research points to a different path: a more comprehensive view of the complexity of the context and the actor within it, since the actor is incorporated in "complex, multiple, overlapping, and dynamic contexts, whose elements include sociality, culture, institutional rules, resources, technological change, and power relations, which in turn are shaped by information actors" (p. 292).

Faced with the complexity of the topic, Dervin (1997, p. 112), states that context has "the potential to be virtually anything that is not defined as the phenomenon of interest." Therefore, he proposes as an epistemological alternative a continuum in which, in a polarized way, the concepts of "context as container" and "context as meaning bearer" are at the extremes. For the first type, Talja, Keso, and Pietiläinen (1999) clarify that these are studies of

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<sup>1</sup> The event later changed its name to The Information Behavior Conference. Available at: <http://www.isic2018.com/>. Accessed on 11 Oct. 2021.

informational behavior in which specific individuals or groups are analyzed against the background of the context and, therefore, they call this approach objective. For the second category, the authors consider a displacement of the context to the foreground, a place where meaning is socially constructed, which entails that this type of approach is called interpretive.

#### 4 THE DUALITY BETWEEN INDIVIDUAL AND CONTEXT

Originally, the shift from a system-centered to a user-centered paradigm brought individual, subjective, situational, and cognitive aspects of information activities to the foreground, putting emphasis on the cognitive point of view. This perspective was criticized, in the emerging social approaches, for neglecting social aspects and for treating information activities as detached from context. Such social approaches have defined context as a major focus of research (VAKKARI; SAVOLAINEN; DERVIN, 1997; COURTRIGHT, 2007).

This movement is described by Olsson (2004) as a "social turn" in information behavior research. The author defends the idea that researchers consider the social context as the fundamental focus of their investigations, and not just as a factor that influences individual cognitive processes.

Over time, the duality of thoughts about the treatment of context and its influence on the field of user studies has implied choices by researchers in supporting their respective viewpoints, thus forming epistemological strongholds.

Tabak (2014) highlights the duality of these approaches. One side of the continuum is occupied by models classified from the cognitive point of view, in which the most important concept is the structuring of knowledge. Cognitive and emotional factors are seen with little interference from the context, with the fundamental principle being the production of knowledge from the creation of mental models. At the other extreme, approaches that consider context as a carrier of meaning present arguments that reject the opposite position by emphasizing the importance of the sociocultural context in informational processes and social interactions that manifest themselves in discourses and language (TALJA, 1997).

For Tabak (2014), there are intermediate approaches that, although well-intentioned, have generated only a displacement between the opposing poles. According to him, positioning oneself "on this continuum becomes a point of differentiation for contemporary theories and models of informational behavior, but also a major difficulty in tracking information activities" (p. 2226).

However, "the middle way" or a middle approach is proposed by authors who, in a contemporary treatment, consider that experiences are determined by our psychological makeup in which cultural factors are mediators of cognition. Attempts to overcome the dichotomy in the field of information and knowledge management can be appreciated since the theory of enabling context or Ba, by Nonaka and Konno (1998) or the informational ecology of Davenport (1998). More recently, efforts called informational practices, based on ethnomethodological perspectives, symbolic interactionism and phenomenology, as well as on the so-called multifaceted (or multidimensional) approaches, seek the same goal: not to neglect individual cognitive processes. However, they add to them information practices with complex phenomena that try to "overcome the individual/social dichotomy" (ARAÚJO, 2014, p.131).

Tabak (2014) explains that there are those who argue that both the context and the individual shape each other, offering a compromise between cognitive and social approaches. In these multifaceted explanatory models, according to Pettigrew, Fidel, and Bruce (2001), it takes an effort to integrate several theories to describe them. Furthermore, in the course of time,

these authors' positions may even change, as Brenda Dervin did. Her 1983 sense making theory changed from a cognitive viewpoint in that decade to a multifaceted approach in the 1990s. Dervin (1997, p. 32) admits that she chose this path "as an appropriate position for a conceptualist worldview that demands dialectical attention."

Pinto and Araújo (2019) state that discourses are constructed from the selection, organization, and combination of concepts, in a context of contestation for power and concealment of ideologies. These tensions between the two types of reductionism, according to Tabak (2014), are the main difficulty in selecting a method to track information activities. Each paradigm carries within it, a contestation about its position on the continuum, even before its empirical application, while old models are sometimes modified to occupy a new position. In this sense, an endless debate about the focus of research on information behavior can be created, limiting the studies to a set of factors defined a priori by the researcher, such as: cognitive/social, objective/interpretive, individual/collective, among others. This circumstance, according to the author, paralyzes the research by forcing the researcher to deal with the challenges of any of the chosen positions. When a position approaches one pole, the risk is to lose the centrality of the information user. When it approaches the other, there is a danger of neglecting the social context.

However, Courtright (2007) states that the concept of context has a role to play in the analysis of information behavior. And that the user-centered paradigm has achieved relatively wide acceptance among researchers. The challenge of research should be to overcome the merely cognitive and affective influences, but without losing sight of the actor as the center of informational activities. According to the author, this seems to be the appropriate path, especially when there is the insertion of actors in the context, presenting itself as an intermediate position.

Therefore, since the tensions between the two types of reductionism are the main difficulty in tracking users' behavior, it is necessary to use other theoretical and methodological frameworks that can account for the characteristics of this field of knowledge and its challenges. Therefore, it is necessary to see information activities as heterogeneous associations in which actors (or information users) and context elements (including non-humans) create a continuous network of socio-technical interaction. The following pages will lead the reader in the search for the symmetry of dualities, present in Actor-Network Theory and in socio-technical hybridity.

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## 5 SOCIOTECHNICAL NETWORKS IN INFORMATION SCIENCE

Sociotechnical networks consist of an agglomeration of elements (people, equipment, standards, techniques, methods, procedures, values, beliefs, culture, organizational structure) that are connected to each other and remain in constant interaction to achieve a common goal (VACARI, et al. 2017).

Employing the notion of a socio-technical network can help overcome reductionist interpretations that consider the existence of a one-way causal relationship between any of these components. Among the possibilities of socio technological approaches, we understand ANT, proposed by researchers Bruno Latour, John Law, and Michel Callon, to be the most relevant and promising for this study.

The scope of ANT has expanded significantly since the first works published by the Frenchman Bruno Latour (ARAÚJO, 2009a; ALCADIPANI, TURETA 2009; TONELLI, 2016; CUSTÓDIO, 2018). In the field of information systems, for example, the difficulties perceived in the execution of national computerization plans and in their unsatisfactory results

have encouraged the adoption of ANT as an analytical instrumental, as exemplified by the research of Cavalcante et al. (2019).

Despite its frank expansion, there are several barriers and criticisms directed at it, especially linked to its supposedly mechanical and apolitical approach (LEE; BROWN, 1994; WHITTLE; SPICER, 2008). After an extensive literature review, Cavalcanti and Alcadipani (2013) raised the four main criticisms of ANT: limited analysis of social structures; amoral attitude, by neglecting political and moral issues; attribution of agency to non-humans; and possible problems regarding how to track entities in a network analysis. His article countered such criticism with empirical work based on methodologies suggested by John Law, one of the main authors to apply ANT in organizational studies.

However, the sedimentation of ANT in IC in Brazil began in 1995. The advance in research in the area stimulated initiatives such as Araújo (2009b), when researching works that directly addressed the constructs of Bruno Latour in the IC research bases, which revealed the presence of 1,235 citations in 43 articles in the period between 1995 and 2007. The study identified theoretical and methodological contributions of ANT to the field, such as the position of "non-modernity", the concept of information, the construction of scientific facts and the proposal to "draw a symmetrical look in understanding the man-technology relationship" (2009b, p. 4).

Subsequently, Custódio's (2018) study covered the subsequent chronological period from 2007 to 2016 and evidenced the frequency with which Bruno Latour's ideas influenced research themes in IC graduate programs in Brazil. In this time frame, it was possible to verify the author's presence in 43 citations in the 414 theses analyzed from graduate programs offering doctoral degrees. Latour ranked 25th among the most cited international authors, with the occurrence of 99 citations in the analyzed theses. He also has a book chapter<sup>2</sup>, as well as two articles published in international journals in the area of IC<sup>3</sup>.

The evidence presented exposes not only the literary guarantees in the field, but mainly the interlocution between ANT and CI. This understanding drives us to present in the next session the contributions that ANT can add to the field of information user studies.

## 6 ACTOR-NETWORK THEORY AND THE SEARCH FOR SYMMETRY

The Actor-Network Theory (ANT) is in a sub-area called Science, Technology and Society (STS) that originated as a research field from the 1960s (LAW, 2008). According to Moura (2018), it was influenced by ethnomethodology, post-structuralism, Michel Foucault's epistemic project, and the concept of rhizome proposed by Gilles Deleuze. This origin is related to the work of Micher Serres, Algirdas Greimas, Isabel Stengers, Gabriel Tarde and Harold Garfinkel (LATOUR, 2005). Although there are, as said, traces of Foucault's ideas in ANT, there are efforts to contextualize their differences and similarities (LAW, 1992b; BERTI; ARAÚJO, 2018). Its use in academia has covered diverse areas such as education, CI, psychology, communication, sociology, geography, and law (TONELLI, 2016).

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<sup>2</sup> LATOUR, Bruno. Networks that reason does not know: laboratories, libraries, collections. In: BARATIN, Marc, JACOB, Christian (coord.). The power of libraries: the memory of books in the West. Rio de Janeiro: UFRJ, 2000b. p.21-44.

<sup>3</sup> LATOUR, Bruno; SIGOGNEAU, Maya. **Une base de données bibliographiques peut-elle devenir une banque de données pour la recherche sur la recherche?** Le Documentaliste, n.4, v.5, p.139-147, 1980.  
LATOUR, Bruno; COURTIAL, Jean-Pierre. **How to measure the degree of independence of a research system?** Scientometrics, Amsterdam, v.4, n.2, p. 119-33, 1981.



ANT employs its own vocabulary, suitable for its use and with unique nuances and meaning for each concept. Among these words adopted in ANT, actant (agent or actor) is perhaps the most appropriate as a starting point. Actant can be a human or non-human (such as processes, hardware, software, documents, etc.) capable of influencing and changing the network in which it is inserted. The notion of network is presented as a set of heterogeneous actants connected and agencyed. Translation is understood as a process conducted by actors that results in the construction of connections, mobilizations, overlaps, mediations or interference, and always involves transformation from one state to another. Controversies are issues still open, without consensus, in which the actants disagree or agree in disagreement, while associations are connections, bonds between actants. Black box means a network element, fact, or artifact in a state of provisional stagnation, to the extent that controversies around it cease (LATOUR, 2011; 2012a; LAW, 1992a). Finally, inscriptions are processes of materialization of analysis, such as the transposition of researched scenarios into graphs, tables, maps that make the phenomena representable. This last definition has specific importance in the following discussion, since, for Latour (2011), information is the representation that is formed between two places. The first is understood as periphery and the second as center, in a conjuncture in which the inscription circulates between them as a vehicle. Efforts of enlargements, reductions, and transformations are made to formulate the inscriptions that occur in what the author calls the center of computation.

Laville and Dionne (1999) warn that concepts and the words that express them are indispensable to know, understand, and explain. For the authors, "concepts are mental representations of a set of reality according to their essential common characteristics" (p. 91). For sure, it is appropriate to raise a latent discussion in the IC field that denotes a search for the word or expression that best represents the concept of information user. This expression, broader and currently accepted in the medium, has faced resistance from some researchers (DAY, 2011; RÉNDON-ROJAS; GARCÍA CERVANTES, 2012; CRUZ; ARAÚJO, 2020) by understanding that it is not enough to comprehend the contemporary relationships of subjects with information. This discussion arises in the midst of the social treatment given to user studies facing the cognitive paradigm, as already exposed. Therefore, the use of the term information subject is the proposal, by these authors, to overcome the inadequacy or insufficiency of the term information user. This does not mean only the replacement of the term, but a change of perspective of who relates to information in various contexts, formats and spaces (CRUZ; ARAÚJO, 2020).

However, under the lens of ANT, the information user or informational subject gains a distinct dimension, given that, through information, the agent can mediate contexts, spaces, other humans and non-humans connected in networks. In view of this, and aligned with the search for the term, word or concept that best represents the information user, ANT presents a proposition in which the informational agent is inserted in an interventionist position in the information present in the network to which he belongs. Thus, using the vocabulary of ANT, the word actant assumes the position of information agent, which, as Latour (2005) states, refers to everything that can generate an action in a specific network and has the potential to perform changes when it acts. In the same work, the author defends his choice for the term actant by saying that using the word actor means that it is never clear who and what is acting when we act, since an actor on stage will never be alone in his performance. Therefore, actant is a term that exposes the one who designates the action. The reason why Bruno Latour chose the term "actor" is related to the interest in not carrying an interpretation of subordination between the parts, in the relationship of one element with the other and with the context. By expanding the meaning of "actor" to actant, it was possible to reduce the admission of the binary viewpoint (subject-object).

Moreover, ANT brings the socio-technical hybridism<sup>4</sup>, an approach that, contrary to dualistic thoughts, proposes an integrated, inseparable look between the technical and the social. This position brings, consequently, diverse opinions about the use of ANT. However, it is exactly these diverse opinions that contribute to the emergence of paradigms and enrich epistemological discussions (SERVA; DIAS; ALPERSTEDT, 2010) until then ignored, or with potential for confrontations or interlocutions. It is in this sense that this paper proposes to address the dilemma of dualisms in the field of information user studies.

The foundations of ANT evoke radical changes in the way nature and society are represented, by attacking traditional concepts such as "the metaphysical dualisms of Western culture" (BOLZANI JUNIOR, 2017, p. 89). By rejecting binary oppositions, Bruno Latour's theory proposes a new dynamic where the social versus the individual, agency versus structure, choices versus order, are shifted to a symmetrical analysis that does not privilege the autonomy of the parts, but allows for a new constitution of them through their interactions (DELANDA, 2010).

These interactions occur between entities<sup>5</sup>, which only come into existence as a function of, or through, a set of relations. This is an interpretation of semiotics called by Law (1999) semiotics of materiality. In this way, an entity will only be so if the elements with which it is related remain (LAW, 2002). Thus, ANT assumes that the existence of actors does not precede the existence of the networks in which they are inserted, bringing a bias of perception, for example, different from the usual current of organizational analysis (DAVENPORT, 2006). Therefore, ANT seeks to repel polarizations by parameterizing humans and non-humans without asymmetries in them. In this direction, it is not considered that natural and technological elements have a well-defined border. Therefore, both should be treated in an integrated manner and through the same vocabulary of analysis (LAW, 1987).

## 7 RESULTS AND DISCUSSION: TAR AS A SYMMETRIC ALTERNATIVE TO THE DUALITIES OF INFORMATIONAL BEHAVIOR

Once we adopt a centrality in the user, or in the context, or the possibility of intermediate positions along the continuum, we have perspectives that do not agree to the ANT view, since there is no such arbitration. For ANT, it is only the continuous circulation of individualization and collectivization processes, in which cognitive and social, human and non-human, user and context constantly exchange properties. Therefore, from this perspective, a context is never a container for users, but an effect of the users' own contextualization (TABAK, 2014). This condition allows one to ignore the divisions between individuals and collectives, because ANT is a hybrid configuration, which is simultaneously a point (or an individual) and a network (or collective) (CALLON; LAW, 1997). This distinction is not only unnecessary, but mistaken, since the source of action is not in the "social context" or the "knowing individual" but is an effect of the arrangement of heterogeneous materials. It is an effect of circulation in which the individual and the collective constantly transmute properties (TABAK, 2014), which means that action cannot be explained "in a reductionist way, as a firm consequence of any specific previous action" (CALLON; LAW, 1997, p. 179).

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<sup>4</sup> The term hybrid is no longer used by Latour (2004), who states that there are necessarily only hybrids, everywhere. The term matters of concern has replaced the original expression in his recent works.

<sup>5</sup> The term entity is understood in TAR as an element that cannot be identified, and therefore can be human or non-human.

Soon, individual and collective in one cycle are no longer the same when compared in a later cycle. In other words, Latour (2012) shows that individualization stabilizes an individual, as collectivization stabilizes a collective, but only for a brief moment, so that this stabilized individual/collective is only a starting point for another individual/collective in another cycle. However, it would be mistaken to claim that these factors are simultaneously individual and collective, because they are not simultaneously, but rather sequentially, manufactured and manufactured. Similarly, the ANT view ignores dichotomies because each "part is as big as the whole, which is as small as any other part" (LATOURE; HERMANT, 1998, p. 45)

ANT, therefore, offers a differentiated approach that considers that information and users, individual or collective, continuously exchange properties, without placing the focus on individuals and (or) context. Thus, the provisional position of an informational subject, proposed here as an actor, can trigger, according to its interests and translations, a reaction from the collective that make up this same network. In this condition, there is the possibility, in a network, of controversies being stabilized by associations, merging into a black box of heterogeneous materials in which the collective, once again, becomes individualized.

Therefore, tracking the actors that stabilize a socio-technical network of reasonably unstable interests allows one to trace informational phenomena with possibilities of understanding the hitherto invisible associations and controversies that may interfere with an information user's informational behavior. Assuming that information manifests and translates without the confining locus of the "individual" or the "context" can reveal social and (or) cognitive forces behind informational activities. The possible results arising from this approach would become imperceptible through the lenses of conventional research in user studies, either by the little flexibility of dualistic positions when compared to the lenses of ANT, or by the low fluidity of states that each entity finds itself facing its temporary relationship with other entities that make up the same socio-technical network.

Thus, ANT claims for itself positions of symmetry that allow us to analyze the context and the decisions made in it without any of the parts, such as users (human) and systems (non-human), being diminished in their essence and importance. These hybrid collectives, in Latour's (2012a) opinion, are a "purification" of knowledge, insofar as the sociology of knowledge criticizes binarisms by denying the existence of a boundary between dualities. The author presents a perspective in which there are no pure objects and subjects, once that objects are subjectivative and subjects are objectivative, therefore hybrids. Therefore, an alternative path, in opposition to this type of dualistic imprisonment, is not only coherent, but also opportune to the methodological repertoire of tracking informational phenomena in the field of user studies, especially in the field of informational behavior. This possibility provides, in a complementary way, a new perspective, or a re-reading of research already completed in the field, by allowing eventual confrontation of results from different points of view.

## 8 CONCLUSION

The Actor-Network Theory can be understood as a meeting of different possibilities of analytical models, to the point that Law (2007) defends the idea that there is not only one ANT. It goes beyond old structuralist categories and provides analytical tools for the understanding of fluid and changing objects (CAVALCANTI; ALCADIPANE, 2013), which encouraged the authors of this article to confront it with informational behavior studies.

Although, as already explained, there are efforts to overcome the dichotomy in studies of information users, ANT offers a different look, an alternative route supported on the symmetrical promise of neutrality, although with the same intent: to solve the polarities present

in the field. The aim was to present ANT and, especially, some of its elements that allow it to be adopted as an alternative for the mapping of informational phenomena, in contrast to reductionist polarities present especially in studies of information users. For Tonelli (2016, p. 388), efforts of this nature are relevant, "since it is perceived a growing interest of the academic community for theoretical orientations that escape the functionalist mainstream".

The ANT theoretical-methodological proposal was presented as an alternative to overcome the dualities present in some approaches of informational behavior studies. This proposal shows considerable potential, especially in tracking complex and unstable informational phenomena that could not be solved simply by humanistic determinism or technological determinism, as well as by the cognitive or social paradigm. Thus, to overcome the duality of interpretations that oppose human and non-human, social and technical, context and individual, alternative and interactionist approach, objective and interpretive, cognitive and social paradigm, the theoretical-methodological approach of ANT takes as unit of analysis the heterogeneous socio-technical weavings called hybrid by Latour (2012a).

The movement of choosing some position in the continuum, even before the empirical investigation of a phenomenon, interferes with the approach that the researcher will apply in his or her research. This choice affects future findings according to the point of view held by the researcher. Thus, this is not simply a criticism of dualism centered on the context or the individual, but fundamentally of the prison that leads researches and researchers to results aligned to a choice that precedes the results. A choice that invariably confirms and (or) refutes epistemological assumptions of one or another pole of informational behavior studies. Transposing the often dualistic or polarized gaze to the symmetrical lenses of TAR allows the researcher a different projection in which, for example, information systems are no longer resources or contexts in a container perspective. For ANT, information systems, as much as any other element, are actors or networks, relocated on the same unprivileged plane. Such a generalized symmetry in ANT, brings the idea of a heuristic tool suitable for understanding the contingent role played by the actors within the network of which they are part.

As future developments to the discussions presented, it is encouraged the conduct of research that can treat the tracking of informational phenomena empirically, using TAR as theoretical and methodological guidance in counterpoint to labeling belonging to the cognitive or social framework. This stimulus is shared with Cavalcanti and Alcadipani (2013), who state that John Law left as a legacy a methodological basis that welcomes complexity and makes it possible to achieve an expressive variety of information process analysis in empirical approaches.

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